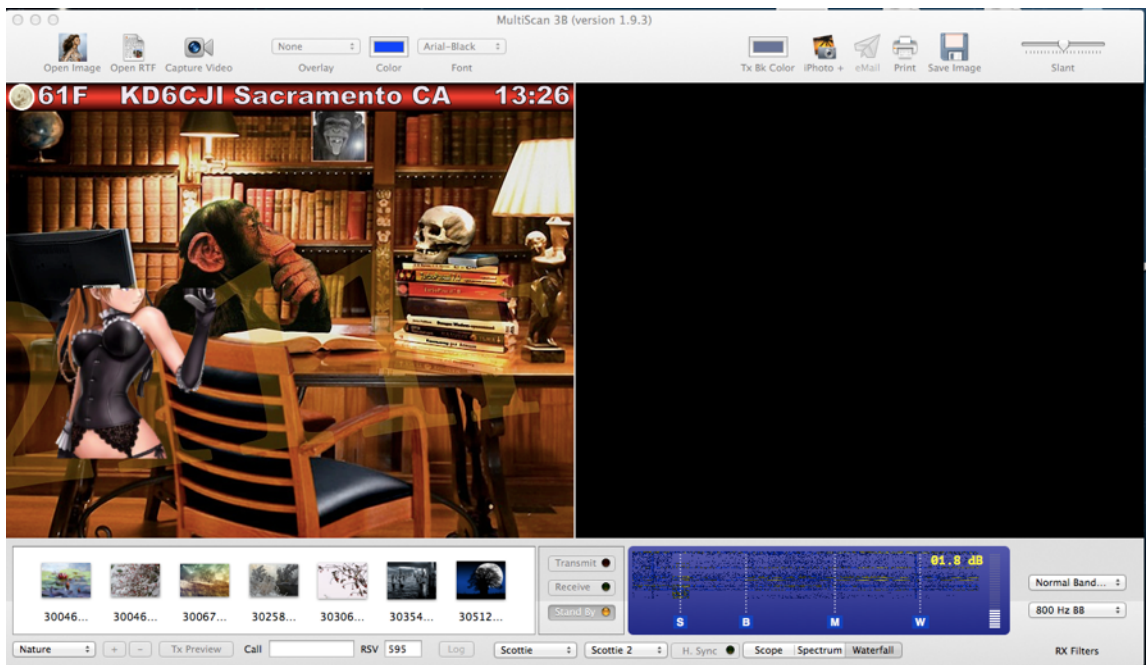


# MULTISCAN 3B

## *User's Guide*



Sergei Ludanov, KD6CJI

September 2013

version 1.9.5

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## Overview

MultiScan 3B is an application for amateur radio Slow Scan Television (SSTV) communications. It is designed and built to run on Mac OS X 10.6 and later versions of operating system.

Main 3 functions of this program is receive SSTV pictures, compose pictures for transmission and transmit pictures.

MultiScan 3B supports the following analogue SSTV formats (modes):

Robot Monochrome : 8s, 12s, 24s and 36s

Robot Color: 12s, 24s, 36s and 72s

Scottie modes: S1, S2, S3, S4, DX and DX2

Martin modes: M1, M2, M3, M4, HQ1 and HQ2

PD modes: 50s, 90s, 120s, 160s, 180s, 240s and 290s

P modes: P3, P5 and P7

Wraase SC2 modes: 30s, 60s, 120s and 180s \*

AVT modes: 243, 90s, 94s and 188s in color and 125s monochrome. \*\*

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*\* It appears that majority of SSTV software does not implement correctly 30s, 60s and 120s modes format, MultiScan 3B implementation is compatible with original SC-2 SSTV converter and may not correctly display pictures transmitted in these modes from SSTV programs.*

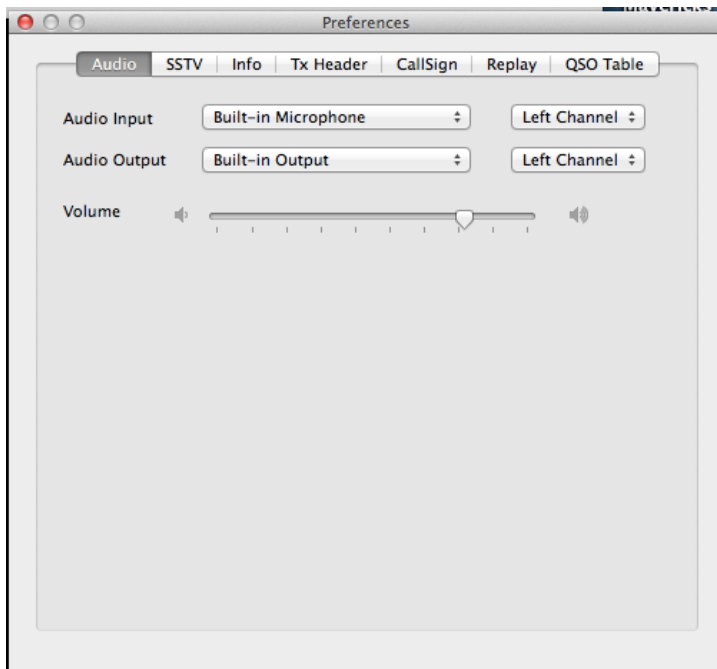
*\*\* All ATV modes can be transmitted and received in regular, narrow, QRM and narrow + QRM modes.*

Currently there is no plans to support digital SSTV modes (which essentially a file transfer via radio).

## Preferences

Before operating SSTV with MultiScan 3B some preferences are need to be set.

After launching program for the first time click on MultiScan 3B menu and select Preferences...



Slow Scan TV is an audio signal and the first step is select an audio device that is or will be connected to your transceiver. Select “Audio” tab in Preferences window and select an input and output audio devices from the pop up buttons. Most audio devices use Left channel for mono signals, which is a default in MultiScan 3B. As far as I know only Icom IC7200 internal USB

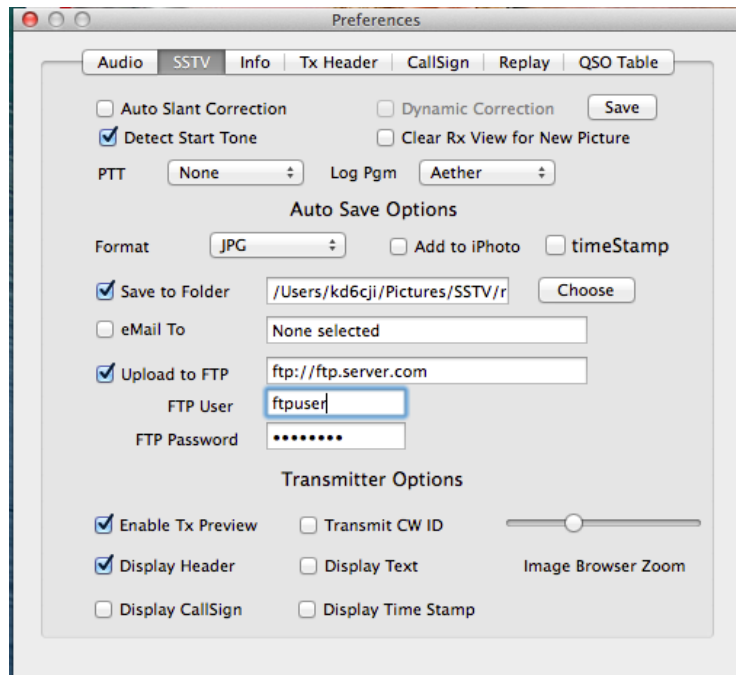
audio uses Right channel. Here you can also set output audio volume, if selected audio device supports this functionality. Setting correct output signal level is critical, so audio signal would not overdrive transceiver. Input audio level is not critical because SSTV signal is FM modulated.

Now select “SSTV” tab. There are many options and most of them can be left as they are set by default.

**Auto Slant Correction.** Most SSTV modes do not rely on line sync pulses but use precise pixel timing when transmitting and receiving images. When pixel timing is different between 2 stations (and in audio card based sstv programs it depends on a value of audio codec sampling rate) the picture is appeared slanted on receive end. Auto Slant Correction, when enabled attempts to correct such pictures. When “Dynamic Correction” is selected picture slant is corrected in real time, while picture being received, otherwise it will correct picture after reception is completed. Auto Slant Correction is far from perfect. In order to correct the slant program needs to detect line sync pulses to adjust timing and this often fails under marginal signal conditions or in the presence of strong QRM/QRN. Most modern comput-

ers and external audio devices, has fairly stable and precise sampling rate therefore in many

cases Auto Slant Correction can be left off. After you change the this settings click on “Save” button.



**Detect Start Tone.** Normally SSTV transmission will start with 1900Hz start tone followed by so called VIS (Vertical Interval Signaling) code. When this option is enabled program will wait for start tone and will not start decoding if start tone is missing, otherwise it will wait for VIS signal. Disabling this option may cause false triggering of reception.

**Clear Rx View for New Picture.**

When this option is enabled program will erase previously received picture from the screen when start of new picture is detected, otherwise it will paint new picture over the previously received one.

**PTT Selector.** When you start transmission program needs to switch your transceiver to transmit mode. If your audio device support digital VOX operation (e.g. Signalink USB) then no software PTT is needed and “None” will be a right choice, otherwise some sort of interface is required. MultiScan does not support any interfaces directly, but can use interface programs such as CocoaPTT (for keying via serial port) and uH Router (that supports microKeyer, digiKeyer and cwKeyer interfaces). Both programs were written by Kok Chen (W7AY) and available from his web site. After you install one or both programs, restart MultiScan 3B and you should see interfaces in “PTT Selection” pop up. Select the one that you are going to use.

**Log Program.** MultiScan can interface with Aether and MacLogger DX logging programs to log SSTV QSOs. If you use either one, select it from this pop up.

Received pictures can be saved and shared automatically selecting various **Auto Save Options**.

First select picture format from **Format** pop up. JPEG (default), TIFF and PNG formats are supported.

If you would like to add SSTV pictures to iPhoto library as soon as they received, select “iPhoto” check box. MultiScan will create SSTV album in iPhoto.

You can choose if you want saved pictures to be time and mode stamped by selecting “timeStamp” check box. Please note, however, that this selection does not affect pictures uploaded to FTP server, those are always time/mode stamped.

To save pictures on disk, first click on “Choose” button, select folder you want pictures to be saved to and click “Choose”. After folder is selected you can enable auto save by clicking on “Save to Folder” check box.

Received pictures can also be automatically emailed as soon as they received. Type in email address and click on “eMail To” check box.

The last option is “FTP Upload”. This requires some more detailed explanation. If you have your website you can create a page that will display last 3 received images (Live SSTV Cam). Sample template for the page is available to download from <http://www.qsl.net/kd6cjj> In order to upload images you need to enter ftp address, user id and password. Address needs to be in the format ftp://ftp.server.name and can also include folder name relative to your root folder. After you enter information click on “Upload to FTP” check box. Every time picture is received program will upload 3 images “Current.jpg”, “Previous1.jpg” and “Previous2.jpg” in order to have pictures displayed on you web site in chronological order without using any php code or java script.

All Auto Save Options can be enabled at the same time.

Next is **Transmitter Options**.

**Enable Tx Preview.** If this option is selected, when you click on Transmit button, the image in transmit view will be displayed in actual resolution based on mode/speed being used. It is approximately what will be seen by receiving stations (minus noise, QRM/QRN, fading). When you use this option, you can not make any edits in transmit view, while picture is sent. In other words, as soon as you hit Transmit button, program transfer image to the transmit buffer, process and transmit it. When you are not using Tx Preview option you can prepare next image for transmitting while current one is being sent.

Most of the following options can also be set using Application Menu.

**Display Header.** When enabled, picture header will be displayed on the top of the transmit view. Depending on the mode it will use top 8/16 or 32 lines of the picture. Header is not displayed in Robot modes.

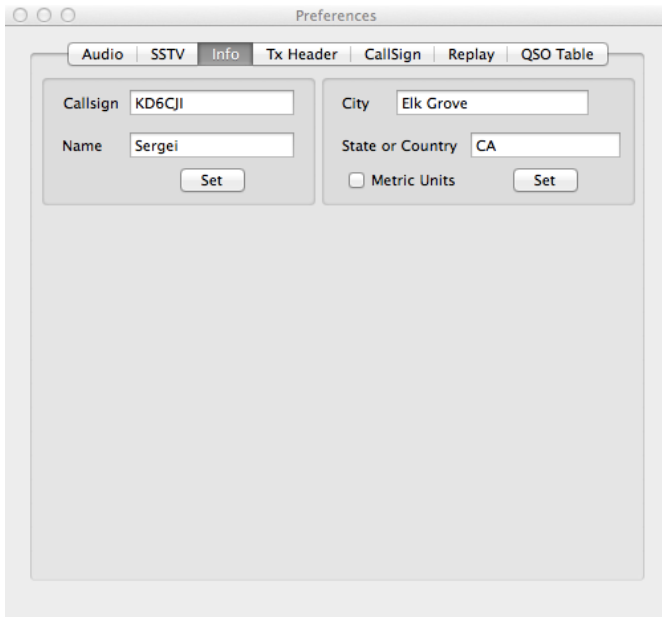
**Display Callsign.** When enabled program will add your callsign overlay to the picture.

**Transmit CW ID.** When enabled at the end of transmission of the picture your callsign will be send in Morse code. It used to be FCC requirement to identify every SSTV transmission with voice or cw. A few years ago FCC dropped this requirement, but many stations still transmit cw id.

**Display Text.** Will display and allow to edit a custom text overlay in a transmitted picture.

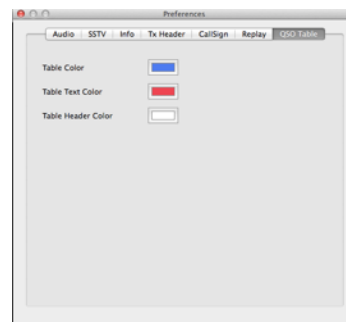
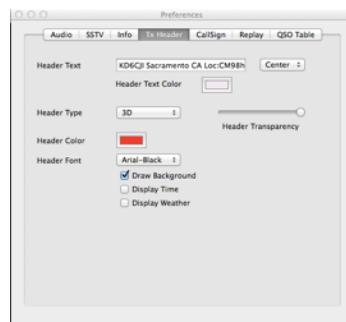
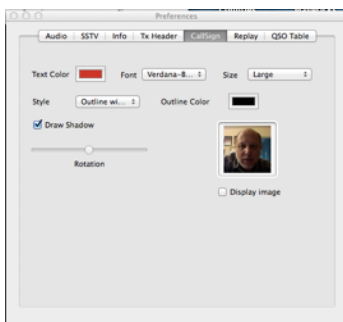
**Display Time Stamp.** Will add date/time overlay to transmitted picture.

**Image Browser Zoom.** Allows you to set the size of picture thumbnails displayed in Image Browser.



Select “Info” tab. Here you will need to enter your callsign, name, city and state (if in US) or country. Your location data is used to retrieve the weather information that can be displayed in the transmit header.. If you select Metric Units, the temperature will be displayed in centigrades.

Most transmit picture overlays can be customized to some degree. In preferences window you can customize the way your callsign, replay image, transmit header and QSO Table will be displayed. Under re-



spective tabs, you can select various options. Note: every overlay

that is added to transmit picture can be dragged around with the exception of transmit picture header.

## Main Application Menu

### File Menu:

**Save Received Image** is used save image from receive view.

**Open Image** is used to open image from disk and load it to transmit view.

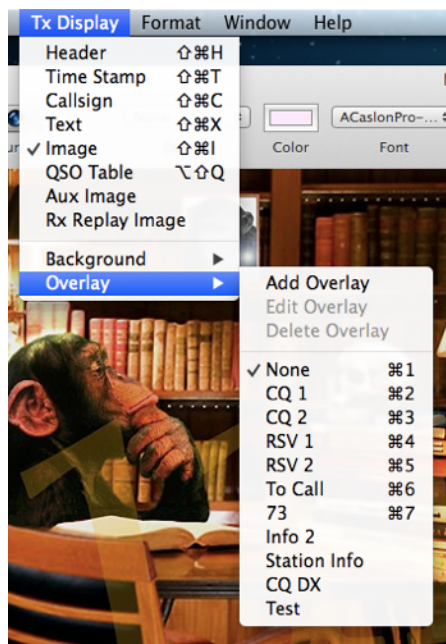
**Open RTF File** is used to open text file from disk and add it as a text overlay to transmit picture.

**Save RTF File** is used to save custom text entered in transmit picture text overlay as an rtf file.

**Add Image to iPhoto** is used to add image in receive view to iPhoto library.

**eMail Image** is used to email image from receive view as an attachment.

**Capture Video** is used to capture a frame of live video from built in iSight camera, or any compatible USB or FireWire web cam connected to the computer.



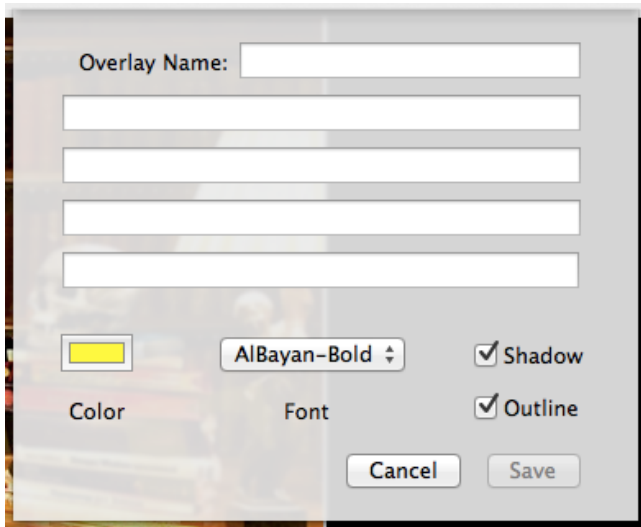
### Edit Menu:

**Clear RX View** is used to clear receive view from the image it displays.

### Tx Display Menu:

This menu allows you to add various overlays to the transmit picture. Each overlay has its own context menu, accessible by either right-click or control-click with the mouse on respective overlay. Overlays and their contextual menus are described in more detail in Transmit Picture Overlays section of this guide.

**Background** is a menu shortcut to select one of the preset colors for the background of transmit view.



**Overlays** menu in addition to selection of one of the preset overlays, allows to create new custom overlays, edit custom overlays and delete custom overlays:

**Add Overlay** will bring up a panel, where you can enter Overlay name and up to 4 lines of text. Here you can select a color and font for the text and choose if you want text with outline and shadow.

**Edit Overlay** will bring up a panel for editing selected custom overlay. You can change any settings except Overlay Name.

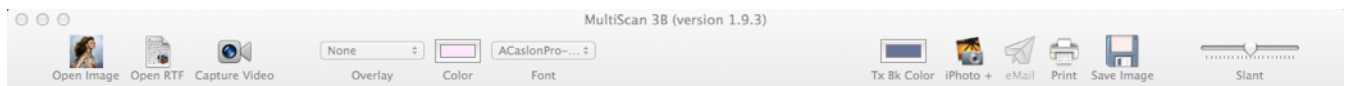
**Delete Overlay** will delete selected custom overlay.

## Format Menu:

Format menu is used to change formatting of the text when Text is selected from Tx Display Menu. It does not work with any other overlays.

## Toolbar

Some functionality, selection and customization of overlays are duplicated in the application toolbar for faster access. Most are self explanatory. Below we'll discuss only a couple of toolbar items.



There is a group of toolbar items: “*Overlay*” Pop Up, “*Color*” well and “*Font*” Pop Up. First one is used to select and overlay from either preset ones, or created by you. The other two allow you to change the color and the font of selected overlay. To the right of the group is “*Tx Bk Color*” color well that let you quickly set a custom background color for transmit view.

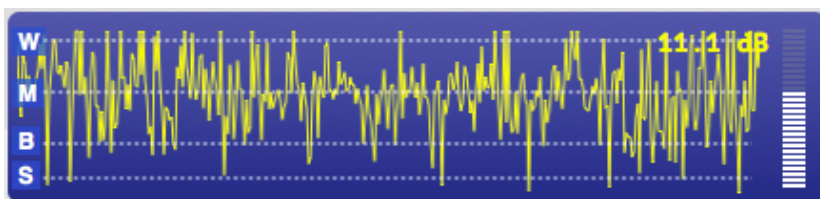
The rightmost toolbar item is Slant slider. This allows you to manually correct the picture slant if it is not too large. You can do it while picture is received or after it is received. The settings will reset to 0 for the next picture.



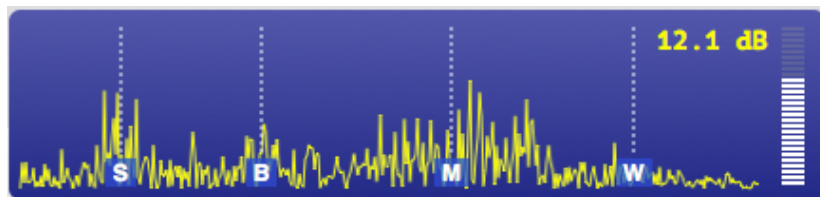
## Receiving SSTV Picture

When you open the program it starts in Stand By mode. You will see the **Stand By** button pressed and yellow led on it blinking. This indicates that program is waiting for the start of the picture. After start tone is received and VIS is decoded program will automatically select proper SSTV mode and speed and start to paint received picture line by line in real time. If you hear the sound of SSTV but don't see picture received (program stays in Stand By mode) it indicates that program was not able either to detect start tone, or decode VIS or picture transmitted by other station uses an SSTV mode that is not supported by MultiScan. Failure to detect start tone or decode VIS may occur for several reasons: it can be that transmitted signal is not properly formatted (start tone too short or too long, there is no gap between two start tone pulses etc.) or most likely that there was too much noise or QRM/QRN at the time when start tone or VIS was sent. In this case you can still try to receive picture forcing program into the receive mode by clicking on **Receive** button or pressing **Option** and **R** keys on the keyboard at the same time. MultiScan will still try to figure out in what mode/speed the picture is transmitted by measuring the interval between consecutive line sync pulses. If this is successful, then received picture will be properly displayed, but a few top lines may be lost.

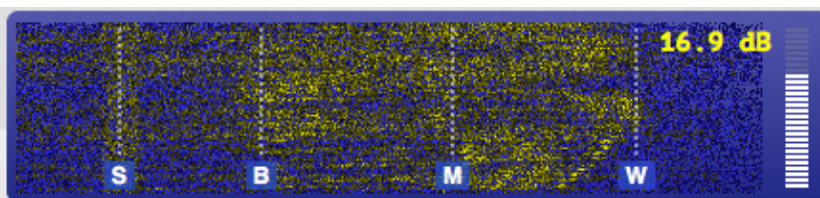
Below receive view on the right there are two pop ups that allow you to select the bandwidth of both front bandpass filter and post detector low pass filter. This may be useful if there is too much noise, however narrowing bandwidth of filters will degrade the resolution of the picture.



On the left of filter selectors there is a view that displays the signal. It has three modes Scope, Spectrum and Waterfall.



The last two are just different representations of signal spectrum, and the first shows oscillogram of the signal. The view also displays the relative signal strength and Signal to Noise ratio (SNR). In general you'll get a usable picture if SNR is greater than 10dB. Signal strength



bar is just for information purposes.

**H.Sync** button under the spectrum display allows you to change the way how program receives the picture. When button is pressed program will use the line sync pulses to synchronize the display of the received picture, otherwise it will ignore line sync pulses and use only line timing based on codec sampling rate. For most modes you should not use H.Sync. This mode is less reliable. By default it is selected for Robot modes and SC-2 modes, but you probably would want to deselect it.

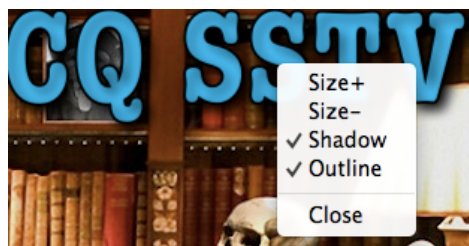
On the left of display are **Transmit**, **Receive** and **Stand By** buttons. When the program is in Receive mode and you want to stop the reception of picture, press **Stand By** button.

When you are conducting SSTV QSO, you can enter the call of the station in the Call textfield and signal report (RSV) in RSV textfield. Those will be used in various templates and also if you are using Aether or MacLogger DX programs you can send this data to the logging program by clicking Log button next to RSV text field upon the completion of the QSO.

## Composing Picture for transmitting

You can go different ways to compose the picture. One way is to do all work in your favorite image editor, save the picture, then open it in MultiScan and hit Transmit button when ready to send. You can also compose a picture in MultiScan itself. This will let you to add dynamic overlays to the picture.

When you open MultiScan for the first time, all you will see in transmit view is a black background. You can change the color either using Tx Bk Color color well in Toolbar or select one of the preset color from Tx Display - Background menu. Under some circumstances you may want just to transmit a text on the background without any images. You have several ways to do it (and they are the same if you are overlaying text over image). You can use one of the preset overlays. They are CQ<sub>1</sub>, CQ<sub>2</sub>, RSV<sub>1</sub>, RSV<sub>2</sub>, To Call and 73. You can create your custom overlays (described in **Tx Display Menu** section above),



When you are creating your custom overlays, you can use placeholder text <ToCall>, <MyCall> , <MyCity>, <MyState> and <RSV>. When you select overlay to display in the transmit view, these placeholders will be replace with the callsign from the textfield below transmit view, your callsign , city and state (or country) that you entered in preferences under

**Info** tab and RSV report from **RSV** textfield.

To display one of the preset or custom overlays you can select it from the Overlay selector in the toolbar or from **Tx Display Menu - Overlays**.

When overlay is displayed you can move it around the view by clicking on it and dragging it with the mouse. If overlay has more than one line of text, each line can be moved independently from others. If you right-click or Control-click on the overlay, contextual menu will pop up. It has the following items:

**Size+** will increase font size by 5 points each time you select this item.

**Size-** will decrease font size by 5 points each time you select this item.

**Shadow** will toggle text shadow.

**Outline** will toggle text outline.

**Close** will remove overlay from the view.

To change text color and/or font use toolbar **Color** and **Font** selectors.

All settings apply only to the overlay displayed and will not affect other overlays, so you can select different fonts, colors, sizes and styles for each preset or custom overlay you created.

In addition to Overlays you can add other elements over your image or background.

## **Header**



which is displayed on the top of the picture. Header is customizable either from Preferences window or to lesser degree from Header contextual menu that has the following items:

**Show Weather** will toggle weather icon and temperature display in the left side of the **Header**. Please note that to use this feature, you need to enter your city and state (or country if outside the US) name and be connected to the internet. The weather information is pulled from Yahoo service.

**Show Time** will toggle the display of current time in the right side of the **Header**. Time displayed in UTC.

**Show Background** will toggle the display of **Header** background

**Background Style** let you select from the following styles:

3D, Flat, Gray Bars and Color Bars.

**Background color** - changes **Header** background color

**Time** <-> **Temp** swaps time and temperature display

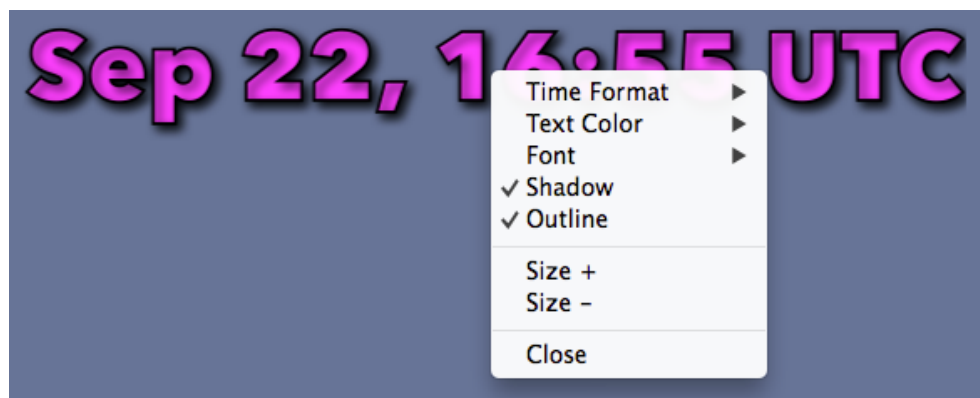
**Edit** - opens preferences screen for Header.

**Close** will remove **Header** from the view.

More customization of the **Header** can be done in Preferences window under **Tx Header** tab. There you can change header text, text font and text color (which will also apply to temperature and time display) and adjust header transparency (see through). **Header** text can be left or right justified or centered in the **Header**.

## **Timestamp**

When selected from **Tx Display Menu**, timestamp will be displayed as an overlay over the image or background. It's contextual menu allows for some customization:



**Time Format** let you select one of four formats:

*Month D, hh:mm* will display timestamp like “September 6, 16:56 UTC”

*MM/DD hh:mm* will display timestamp like “09/06 16:56 UTC”

*DD.MM hh:mm* will display timestamp like “06.09 16:36 UTC”

*hh:mm* will display just time like “16:36 UTC”

**Text Color** let you change the timestamp color to one of the preset colors.

**Font** - selects font for timestamp display

**Shadow** will toggle timestamp shadow.

**Outline** will toggle timestamp text outline.

**Size+** will increase timestamp font size by 5 points each time it is selected.

**Size-** will decrease timestamp font size by 5 points each time it is selected.

**Close** will remove timestamp overlay.

## **Callsign**



When selected, your callsign will be displayed as image overlay. You can customize callsign from contextual menu and Preferences window's Callsign tab. You can change callsign font, size,color, add or remove shadow, select one of the styles, rotate it and also add a small picture (e.g. your portrait) to be displayed on the right of callsign. To do so drag a picture from Finder, Desktop or image browser and drop on the image view above Display image

checkbox. Click on checkbox to display or remove picture from the callsign display.

## **Text**

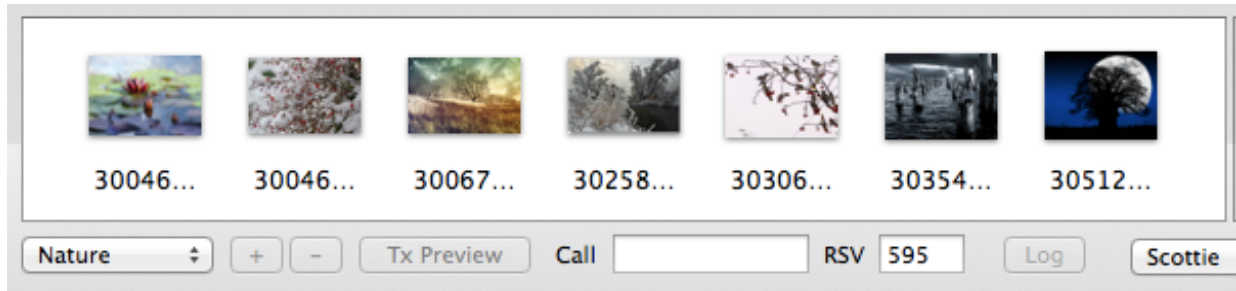
When selected from **Tx Display Menu**, text view will be overlaid over the image or background. It works pretty much as a text editor, so you can enter any text, change font, font size, font color and so on. Text you entered is automatically saved and displayed next time you select the **Text**. You can also create text overlays with text edit or similar editor, save as RTF file and then open it from menu or toolbar to display in the transmit view.

## **Image**

Image probably the most important element of the transmit picture and therefore there are a few ways to add image to the view. Traditional way is to select Open Image from File menu or click on Open Image toolbar item. It will add selected image to the view. If you want image to occupy all view, it needs to have a size of 640 X 512 pixels or proportional to it. oth-

erwise it will be scaled and centered in the view. Image has its contextual menu from which you can select one of the image effects, and flip image horizontally. To remove image from the view select Image from **Tx Display** menu.

The other way to work with images is to use image browser located under the transmit view.



First you will need to add folder from which you want to pull images. To do it click on + button under image browser and select a folder from the panel that will be open. Once folder is selected images will be loaded and displayed in the image browser. From there to add image to the view you can either double click on the thumbnail or drag it and drop to the view. You can add as many folders to the image browser as you wish and switch between them using folder selector left to the + button. You can remove any folder from the selector by selecting it first and clicking on - button. It is handy to create folders named by picture themes for example “Nature”, “Pets”, “Portraits” and so on, but images corresponding to the theme to the folders and then add them to image browser, it will allow quick selection and loading desired images.

Image Browser also have a contextual menu. When you right click on the picture in image browser it will give you an option to load picture as main Image or Aux Image into Tx Display and also provides to zoom in and out images in browser without going to preferences.

Image browser also creates a dynamic folder called Rx Memory. It places there every image that is received. When you quit the program this folder is deleted.



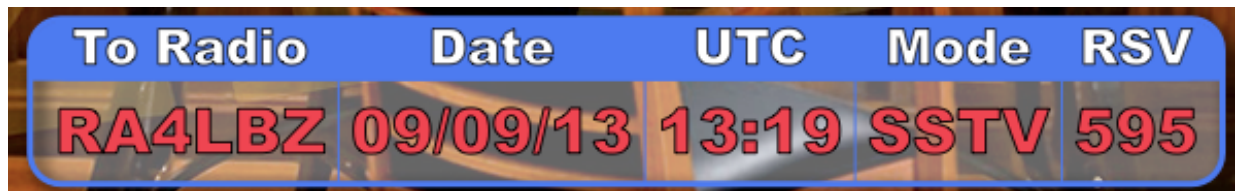
In addition images can be dragged from the desktop of Finder and dropped on the transmit view. You can also drag and drop images from the web or iPhoto.

You can also load an image from your web cam or built in iSight camera. Select Capture Video in File menu or click on **Capture Video** toolbar item. This will open a panel displaying video from the

camera. If you have more than one camera connected to your computer you can select which one you want to use. Then click on the **Freeze** button to capture image or **Cancel** if you changed your mind.

### ***QSO Table***

When selected from **Tx Display** menu, QSO Table will be placed as an overlay in transmit



To Radio	Date	UTC	Mode	RSV
RA4LBZ	09/09/13	13:19	SSTV	595

view. This table is similar to one displayed on QSL cards. It contains To Radio, Date, UTC, Mode and RSV columns, data is populated from Call textfield and RSV textfield. Date, UTC is dynamically loaded, Mode is always SSTV. QSO Table can be customized using

Preferences window's QSO Table tab. You can change table color, text background color, table header text color and data text color. Font size and style is fixed.

### ***Auxiliary Image***

Auxiliary Image is similar to picture-in-picture display on your TV. It is a small image that can be added to transmit view by selecting from Tx Display menu. This image is square and can be set to one of the three sizes: 128X128, 192X192 or 256X256 pixels. To add display and image in Aux Image view you will need to drag image from either Image browser or Finder.

Aux Image context menu let you change the size of the image, flip it and close. Before you drag the image to Aux Image it is advisable to set the size of Aux Image to Large and then change it to the size that is suitable for your purpose, because image is scaled to the Aux Image size when loaded.

### ***Rx Replay Image***

When you receive the picture and want to add it to your transmit image, select Rx Replay Image from **Tx Display** menu. You can use contextual menu to change image size or remove it from transmit picture, you can also rotate the image from Preferences window's Replay tab. Rx Replay Image will be reloaded with every new received picture.

## Transmitting Picture

Now that you compose your image to your liking, you are ready to transmit! You can select the transmission mode and speed using to selectors located under Stand By button. Left selector selects mode and right speed corresponding to this mode. Selectors will automatically select the mode and speed of the last picture received and it is a good practice if you answering someone's CQ call, to transmit in the same mode that other station used. If you are going to send CQ you are free to choose any mode your wish. Most popular are Scottie 1 and 2 and Martin 1 and 2 modes. Occasionally you will see stations transmitting Robot 36 Color and PD 50 mode (my personal favorite).

## In Conclusion

MultiScan program is a moving target and changes are often made, so time from time this manual may lag behind program changes, I have only so much time to maintain both, but you are always welcome to send feedback, report problems and ask questions by emailing me at [kd6cji@mac.com](mailto:kd6cji@mac.com) I appreciate hearing from MultiScan users.

Developing MultiScan takes a lot of time and efforts and if you want to support the development, I will happily accept your donations :-)

**Happy SSTVing!**



